January 1970

Test 1055: Oliver 1955 Diesel

NEBRASKA TRACTOR TEST 1055 – OLIVER 1955 DIESEL

POWER TAKE-OFF PERFORMANCE

	Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—984 rpm)									
	108.16	2400	6.856	0.437	15.78	188	56	75	29.260
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	96.32	2518	6.308	0.451	15.27	184	57	75	
	0.00	2649	1.968			167	56	73	
	49.61	2594	4.140	0.575	11.98	173	57	75	
	108.77	2400	6.865	0.435	15.84	187	57	75	
	25.08	2622	3.026	0.831	8.29	170	57	75	
	73.33	2555	5.176	0.486	14.17	176	57	76	
Av	58.85	2556	4.581	0.536	12.85	176	57	75	29.253

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cooling med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—8th Gear (3rd Direct)											
90.32	7919	4.28	2398	7.81	6.951	0.530	12.99	169	55	64	28.960
75% of Pull at Maximum Power—Ten Hours—8th Gear (3rd Direct)											
72.97	5915	4.63	2525	5.22	5.783	0.546	12.62	169	55	62	28.808
50% of Pull at Maximum Power—Two Hours—8th Gear (3rd Direct)											
52.38	4098	4.79	2571	3.77	4.705	0.619	11.13	166	50	55	28.995
MAXIMUM POWER WITH BALLAST											
84.49	12639	2.51	2450	14.83	4th Gear (2nd Under)			176	59	68	28.710
88.70	9544	3.49	2400	9.69	6th Gear (3rd Under)			172	56	65	28.910
90.43	7911	4.29	2398	7.51	8th Gear (3rd Direct)			172	56	65	28.910
89.62	7097	4.74	2399	6.69	9th Gear (4th Under)			175	57	67	28.910
89.54	6429	5.22	2396	6.00	10th Gear (3rd Over)			173	57	67	28.910
92.12	5970	5.79	2404	5.54	11th Gear (4th Direct)			174	57	68	28.910
92.10	4933	7.00	2399	4.44	12th Gear (4th Over)			173	58	68	28.910
92.85	4225	8.24	2396	3.97	14th Gear (5th Direct)			175	57	67	28.910
MAXIMUM PULL WITHOUT BALLAST											
82.42	9186	3.36	2465	14.81	6th Gear (3rd Under)			170	61	70	28.680

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST
8th Gear (3rd Direct)

Pounds Pull	7911	8515	8662	8573	8419	7887
Horsepower	90.43	86.65	78.17	68.56	57.76	44.86
Crankshaft Speed rpm	2398	2150	1912	1691	1448	1194
Miles Per Hour	4.29	3.82	3.38	3.00	2.57	2.13
Slip of Drivers %	7.51	8.25	8.54	8.54	8.10	7.51

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 20.8-38; 10; 18	Two 20.8-38; 10; 14
Ballast	—Liquid	995 lb each	None
	Cast iron	1260 lb each	None
Front tires	—No, size, ply & psi	Two 11L-15; 8; 40	Two 11L-15; 8; 40
Ballast	—Liquid	None	None
	Cast iron	233 lb each	None
Height of drawbar		19½ inches	20 inches
Static weight with operator	—Rear	12940 lb	8430 lb
	Front	3280 lb	2815 lb
	Total	16220 lb	11245 lb

Department of Agricultural Engineering
Dates of Test: October 15 to October 24, 1970
Manufacturer: WHITE FARM EQUIPMENT COMPANY, HOPKINS, MINNESOTA

FUEL, OIL and TIME **Fuel** No 2 Diesel **Cetane** 53.5 (rating taken from oil company's typical inspection data) **Specific gravity** converted to 60°/60° 0.8276 **Weight per gallon** 6.891 lb **Oil** SAE 30 **API service classification** MS, DS **To motor** 1.959 gal **Drained from motor** 1.425 gal **Transmission and final-drive lubricant** SAE 80 **Total time engine was operated** 381½ hours.

ENGINE **Make** Oliver Diesel **Type** 6 cylinder vertical with turbo charger **Serial No** 190910 **Crankshaft mounted** lengthwise **Rated rpm** 2400 **Bore and stroke** 3⅞" x 4⅝" **Compression ratio** 16 to 1 **Displacement** 310 cu in **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** two stage dry type with precleaner and automatic dust unloader **Oil filter** bypass and full flow replaceable cotton elements **Oil cooler** engine coolant heat exchanger for crankcase oil and radiator for hydra-power oil **Fuel filter** primary filter with replaceable cotton element and secondary filter with replaceable pleated paper element **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS **Type** standard **Serial No** 222473692 **Tread width** rear 61½" to 111½" front 61½" to 87½" **Wheel base** 109⅝" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.1" Vertical distance above roadway 36.0" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled power shifting **Advertised speeds mph** first 1.5 second 1.8 third 2.1 fourth 2.7 fifth 3.3 sixth 3.7 seventh 3.9 eighth 4.4 ninth 4.8 tenth 5.3 eleventh 5.8 twelfth 6.8 thirteenth 7.0 fourteenth 8.2 fifteenth 9.8 sixteenth 11.9 seventeenth 14.4 eighteenth 17.2 reverse 1.8, 2.1, 2.6, 4.4, 5.3 and 6.4 **Clutch** single plate dry disc with cermetallic buttons and operated by foot pedal **Brakes** triple dry disc hydraulically power actuated by two foot pedals that can be locked together **Steering** hydrostatic power **Turning radius** (on concrete surface with brake applied) right 155" left 155" (on concrete surface without brake) right 170" left 170" **Turning space diameter** (on concrete surface with brake applied) right 310" left 310" (on concrete surface without brake) right 350" left 350" **Belt pulley** 1035 rpm at 2400 engine rpm diam 11⅝ face 8¾" **Belt speed** 3049 fpm **Power take-off** 984 rpm at 2400 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with the SAE and ASAE test code. First, second, and third gears were not run as it was necessary to limit the pull in fourth gear to avoid excessive wheel slippage. Fifth, seventh, thirteenth, fourteenth, fifteenth, sixteenth, seventeenth and eighteenth gears were not run as test procedure requires only eight gears.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1055.

L. F. LARSEN
Engineer-in-Charge
G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of AutomotiveEngineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread-height.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power. ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

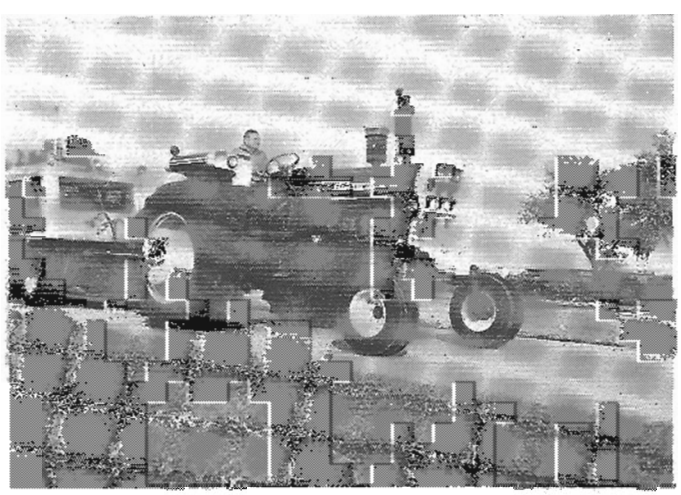
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 8 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

Varying Drawbar Pull and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.**



OLIVER 1955 DIESEL